

November 28, 2018

Ex Parte Communication

VIA ELECTRONIC SUBMISSION

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street SW – Lobby Level
Washington, DC 20554

**Re: Nationwide Number Portability, WC Docket 17-244
Numbering Policies for Modern Communications, WC Docket 13-97**

Dear Ms. Dortch:

On Wednesday, November 27, 2108 I met with Nicholas Degani, Senior Council, and Nirali Patel, Wireline Advisor, to Chairman Ajit Pai to discuss the above-referenced proceedings¹. As the inventor of the Non-Geographic Location Routing Number (NGLRN) solution for Nationwide Number Portability (NNP), I wanted to provide input on a number of issues related to both NNP and NGLRN. Specifically I discussed:

- The need for an accurate definition of NNP to facilitate the industry process of evaluating and potentially deploying NNP,
- Why the National Location Routing Number (NLRN) solution is not viable,
- How the majority of costs associated with NGLRN are incurred by only those that choose to deploy NNP,
- That the main industry-wide requirement of NGLRN is the ability for all carriers to route calls to an NGLRN,
- The multiple benefits of the NGLRN solution beyond NNP, including the ability to provide a pathway for retiring LATA tandems thus transitioning the PSTN from a regulatory-driven TDM environment to a market-based IP environment, and
- Next steps for addressing open issues related to the deployment of NGLRN.

I stressed the fact that NGLRN was a transformative concept that integrated the legacy TDM networks with the now dominant IP networks and allows them to co-exist while transitioning from one to the other.

Please contact me should you have any questions.

Sincerely,
Tom McGarry

¹ Notice of Proposed Rulemaking and Notice of Inquiry In the Matter of, *Nationwide Number Portability*, WC Docket 17-244 and *Numbering Policies for Modern Communications*, WC Docket 13-97.

Ms. Marlene H. Dortch
November 28, 2018

cc: Nicholas Degani
Nirali Patel

Transforming the PSTN through NNP

November 27, 2018 FCC Meeting

Tom McGarry

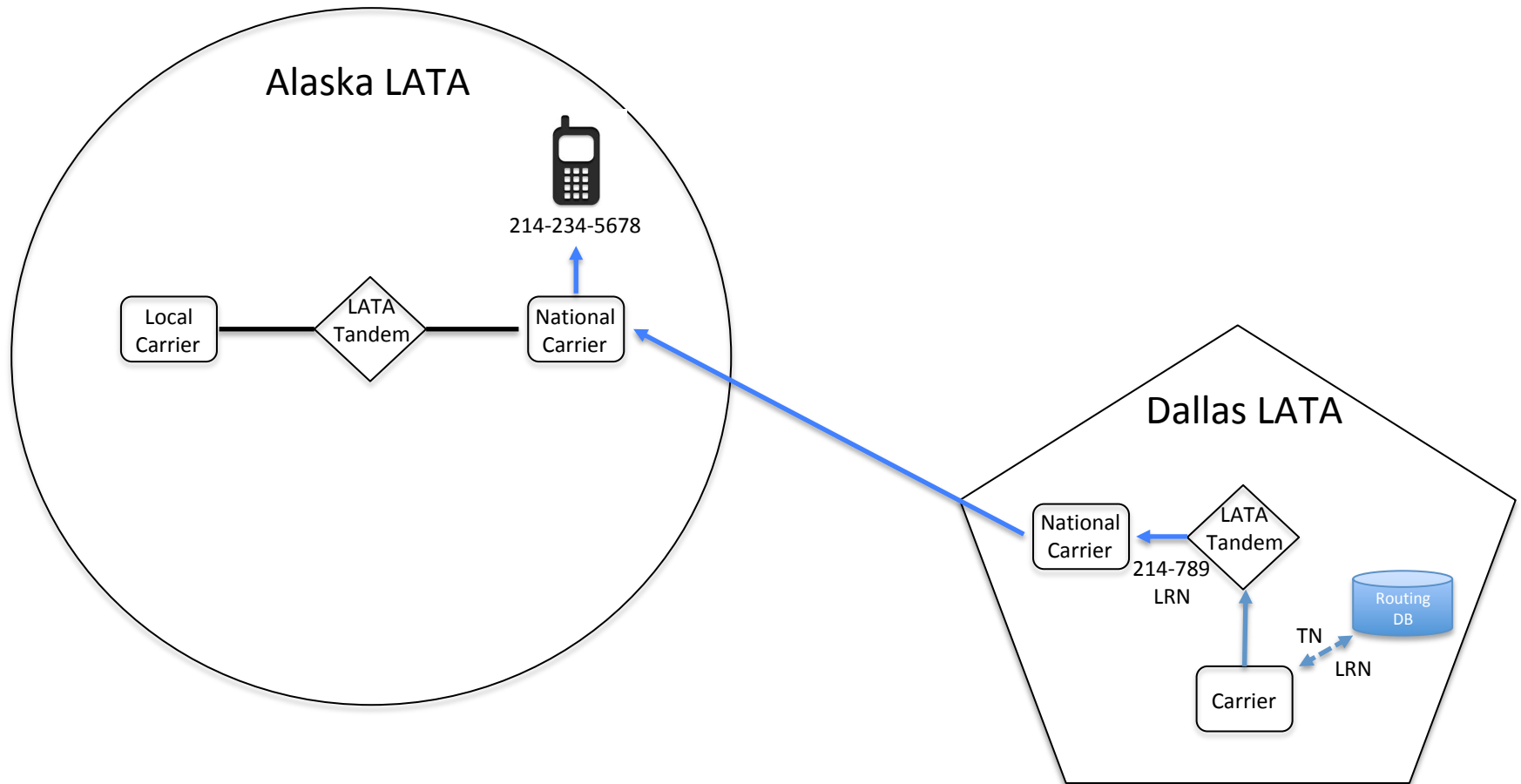
Executive Summary

- The industry should adopt a new meaningful definition of NNP
 - *“The ability of a carrier to port-in a TN without requiring interconnection to the LATA tandem associated with the porting TN.”*
- NGLRN is the only viable solution for NNP
 - NLRN is not viable
- There are other significant benefits to NGLRN
 - Provides a method for the industry to transition from TDM to IP
 - Transition to a more market-based and less regulatory environment
 - Provides a platform for deploying IP-based number administration processes
 - Introduces the possibility for non-geographic numbers for traditional voice and text services

First – what is NNP?

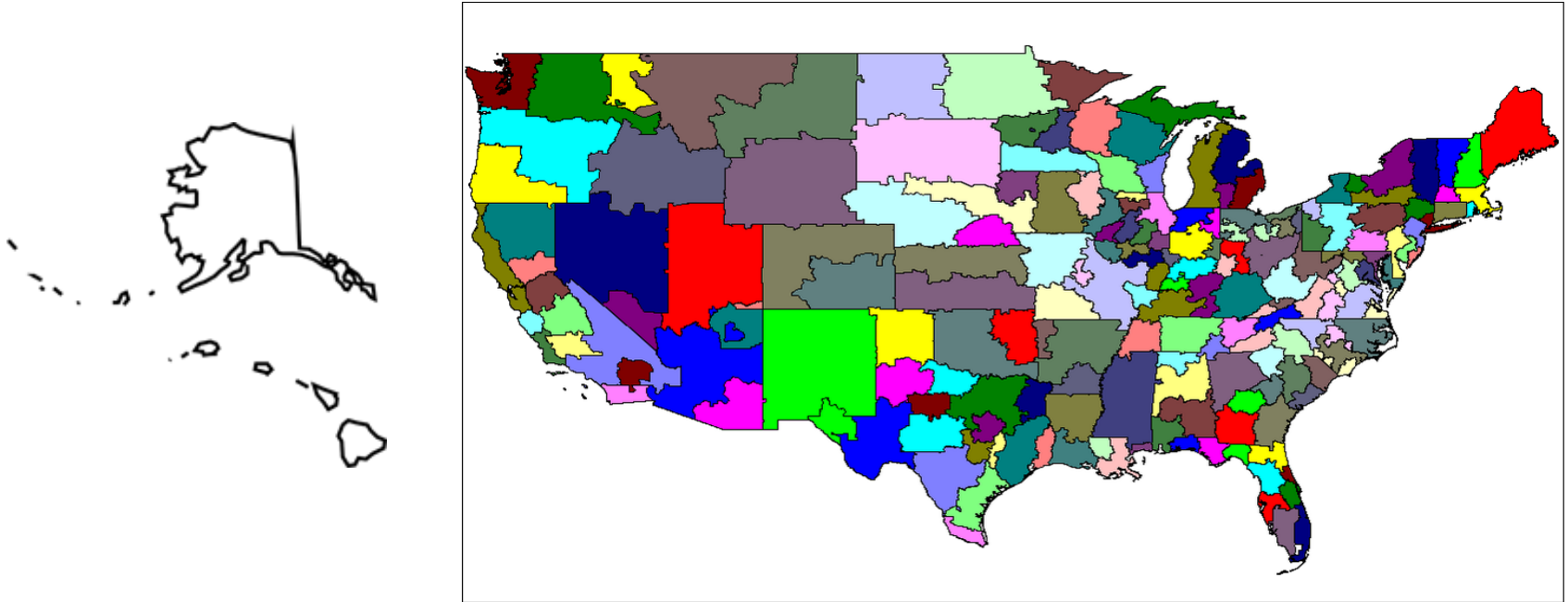
- What it is NOT
 - *“... the ability of users ... to retain ... numbers ... when moving from one physical location to another.”*
 - June 2018 Report of the NANC NNP Issues WG
 - This has been commonplace for well over a decade
- What it IS
 - A complex technical requirement related to interconnection and numbering
- New Definition of NNP
 - *“The ability of a carrier to port-in a TN without requiring interconnection to the LATA tandem associated with the porting TN.”*
- The industry will NOT solve NNP, until they acknowledge what they are trying to solve

NNP use case – Dallas user moves to Alaska



- The Local Carrier cannot port-in the Dallas TN because it does not have interconnection (and an LRN) in the Dallas LATA tandem
- The National Carrier can port-in the TN
- NNP - How can the Local Alaska Carrier port-in the Dallas TN w/o requiring interconnection to the Dallas LATA tandem?

NGLRN eliminates the LATA tandem for NNP calls



- There are 204 LATAs, therefore 204 LATA tandems*
 - Connecting to all of them is difficult and costly
- Non Geographic LRN (NGLRN) ports a TN to an LRN from a new non-geographic area code not associated with existing LATA tandems

* Actually there are more than 204 because some LATAs have more than one tandem.

NGLRN Overview

- NGLRN
 - Eliminates the need to route calls through the LATA tandems
 - Requires no software upgrades to TDM networks
 - Places the majority of cost on only those service providers that choose to implement NNP
- The ONLY NGLRN industry-wide requirements are:
 - Minor upgrades to NP processes and systems to add NGLRNs, e.g., NPAC upgrade
 - Ability to route calls to an NGLRN
 - This is the main industry-wide requirement
- All other requirements are only for those that choose to implement NNP

Three main components of NGLRN

- A new non-geographic area code to provide NGLRNs
- A new number administration function for NGLRN assignment
- IP switches, called Non-geographic Gateways (NGGW)

The new non-geographic area code

- The purpose of the new area code is to enable calls to NNP TNs from TDM networks
 - All switches will be able to route calls based on an area code
- The area code is an indicator that the call needs to be sent to an IP network for NNP call processing
 - NNP call processing is the ability to translate the NGLRN to a URI, and use the URI to route to the NGGW

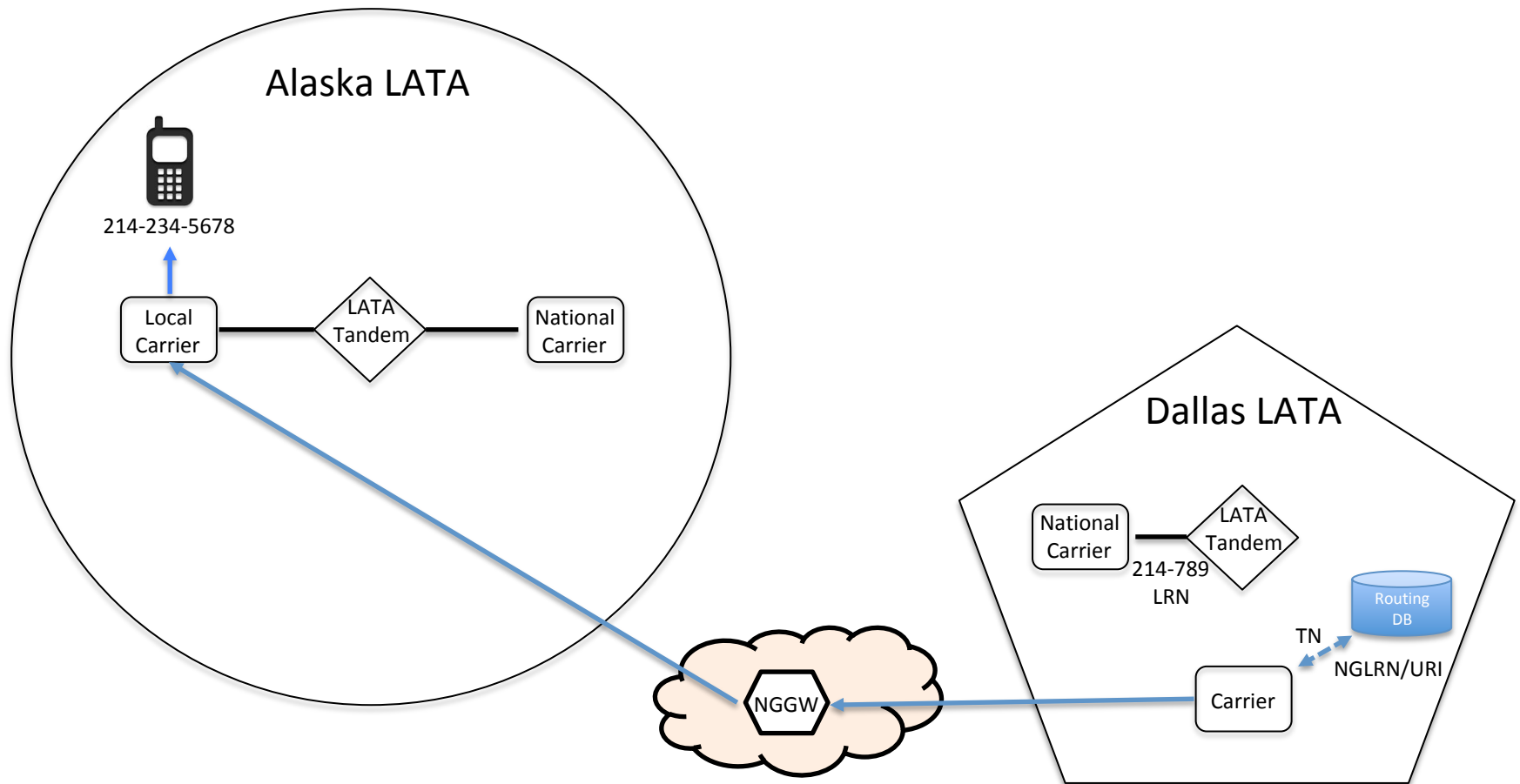
The new NGLRN administration function

- NGLRNs will be assigned by an administrator to service providers that deploy NGGWs
 - Function would be funded by those that use it
- The NGGW provider will provide administrative data including a URI address of their NGGW, for example sip:nggw.telco.net
- Carriers use the URI to route to the NGGW
- NGLRNs are assigned individually NOT in blocks, such as CO codes or thousands blocks
 - 1 NGGW = 1 NGLRN
- NNP TNs are ported to an NGLRN in the NPAC
 - The TN is ported in its “home” NPAC, i.e., a Northeast TN is ported in the Northeast NPAC

NGGWs

- Carriers choose whether to deploy an NGGW to provide NNP service to their customers
 - If a Carrier chooses not to provide NNP for its customers, there's no need to deploy an NGGW
- Carriers can also choose to be an NGGW provider to other carriers
 - Wholesale providers (e.g., Bandwidth.com) and alternative tandem providers (e.g., Inteliquent) are likely candidates to provide NGGW services to others
- No regulatory requirement to deploy an NGGW, nor provide NGGW services to others
- NGGWs are effectively a replacement for the LATA tandems

NGLRN – Dallas user moves to Alaska



- The Carrier queries the TN and receives the NNP routing data, i.e., NGLRN and/or URI
- The call is routed to the correct NGGW
- The NGGW routes the call to the Local Carrier in Alaska

Other benefits of NGLRN

- Deploys NNP w/o requiring upgrades or replacement of TDM equipment
- Integrates the TDM and IP networks
- Provides a pathway for retiring the LATA tandems
 - TNs ported to an NGLRN will no longer need to traverse the LATA tandem
 - Effectively eliminates LATAs
- Provides a method for migrating TNs from TDM to IP
 - More IP TNs = More STIR/SHAKEN
- Greenfield NGLRN administration function provides the ability to deploy IP-based number administration processes
 - For example, it could be deployed via a distributed ledger solution with minimal central administration
 - Processes used for NGLRN admin could be applied to other numbering resources
- The new area code could also be used to provide non-geographic TNs to consumers for traditional voice and text service
 - This could provide relief to existing geographic area codes
 - Perhaps consumers would like a vanity area code, e.g., 222

Next steps

- NGGW provider policies
 - Should there be a certification process?
 - Are there minimum requirements?
 - What are the interconnection policies? Should they offer it to everyone?
- Billing issues
 - Is there a need for regulation regarding costs charged for NGLRN transport, NGGW transport or NGGW interconnection?
- NGLRN administration
 - Need to define the functions and processes in light of its focus on the IP network
- Evaluate NPAC changes
 - Adding NGLRNs and ability to have the same NGLRN in multiple NPACs
- Non-geographic area code
 - How to choose the area code?
 - What are the policies for assigning the area code and how do they apply to other NANP countries?
 - Should we open the area code for assigning TNs to users? What would those policies be?
- NANC seems ill-equipped and unwilling to address these issues
 - Perhaps the FCC TAC is a better choice

APPENDIX

Transforming the PSTN through NNP

November 27, 2018

Tom McGarry

NLRN would be a wasted effort

We know NLRN causes failures

- NLRN causes call failures on TDM networks
 - Call failures were identified in NANC's 2006 LNPA WG report on porting TNs out of the LATA (i.e., NLRN) for disaster relief after Hurricane Katrina
 - Little detail is provided, but this comes as no surprise
 - LNP rules prohibit porting outside of the LATA
 - Logical that carriers would implement checks on this requirement
- We don't know if the problem is due to switch translations or generic switch software
 - But it doesn't matter, either problem is insurmountable
 - Generic software is the operating system provided by the switch vendor
 - This CANNOT be fixed, vendors do not make new software for TDM switches
 - Switch translations are routing programs implemented by the carrier
 - Theoretically switch translations can be reprogrammed, but in reality they can't
 - Translations implemented in 1997 would be nearly impossible to fix today
 - Translations can, and likely are, different from carrier to carrier (even within a carrier)

Nearly impossible to test all equipment

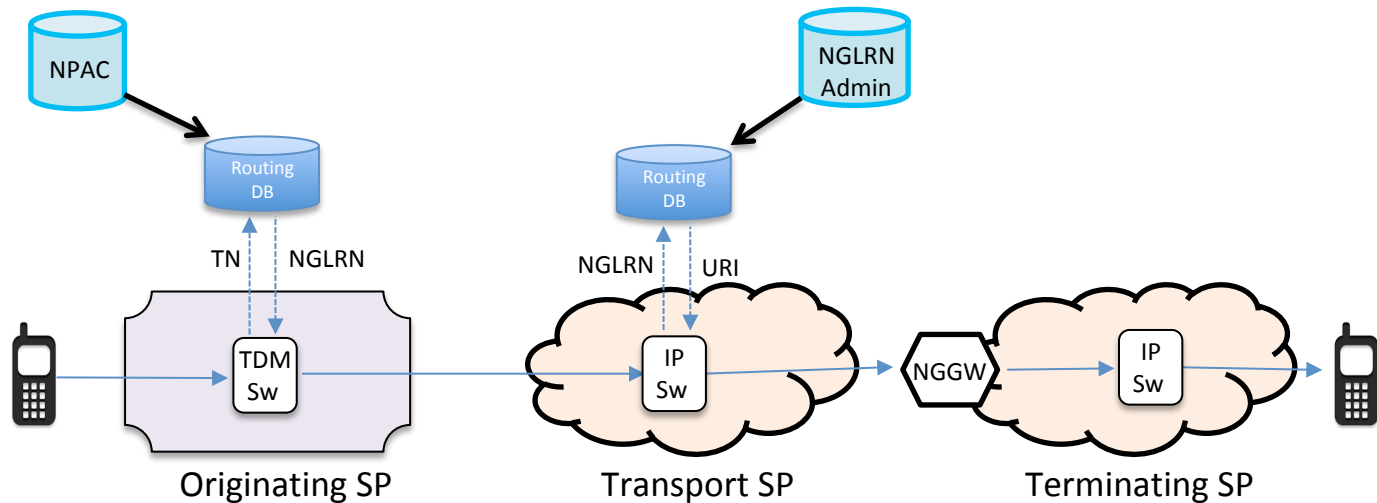
- Problems likely exist on AT&T, CenturyLink and Verizon networks, and on hundreds of other small carriers
 - How do we test them all?
 - During 2017 NNP WG effort ATIS objected to managing an industry testing process due to the difficulty and uncertainty (and they were correct)
 - Suppose we roll it out and find out that there are places that were not tested and fixed? ... force a switch replacement? ... undo NNP? ... ?
- We know so little about the existing problem and what about problems we don't know about?, i.e., unknown unknowns
- And why are we trying to fix ancient TDM equipment anyway?
- The solution needs to remove TDM equipment as an obstacle

Furthermore ...

- No one has been talking about the IP networks!
- These same limitations have, very likely, been implemented on those networks too
 - It's the same companies that implemented them on the TDM networks, maybe the same people
 - These calls are not supposed to happen – why wouldn't they block what looks like possible fraud or a security breach
- These issues could be overcome on the IP networks – but they likely still exist
- NLRN must undo 20 years of entrenched engineering, on both discontinued TDM equipment and IP equipment, to be successful
- (... and we haven't even addressed the operations support systems)

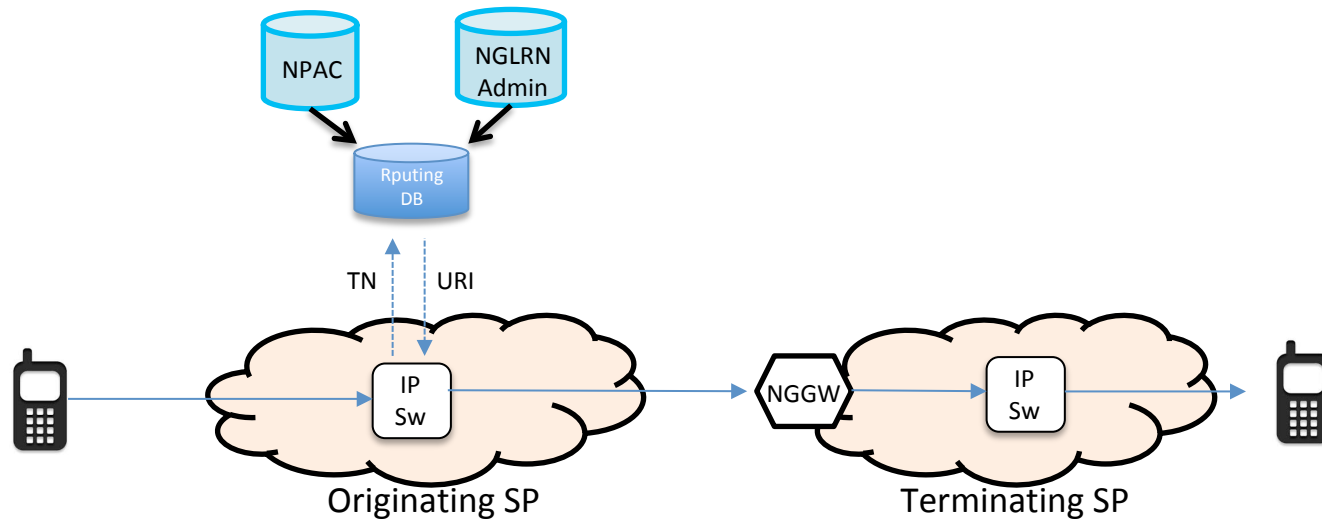
NGLRN call flows

NGLRN call flow – TDM to IP



- The non-geographic area code is an indicator to the switch to send the call to an IP network for NNP call processing
- The call is routed to the IP network
 - This could be the originating carrier's IP network or a transport provider that the carrier has contracted to handle NNP calls, e.g., an IXC
- The IP network queries the NGLRN to obtain the URI, then routes the call to the NGGW identified by the URI
- The NGGW routes the call to the terminating service provider

NGLRN call flow – IP to IP



- The IP network queries the TN and receives the URI identifying the NGGW
 - Carriers will integrate routing data from both the NPAC and NGLRN administration system to provide the most useful response
- The call is routed to the NGGW and onto the terminating network